AUGUST 1934 • VOL. III. No. 4

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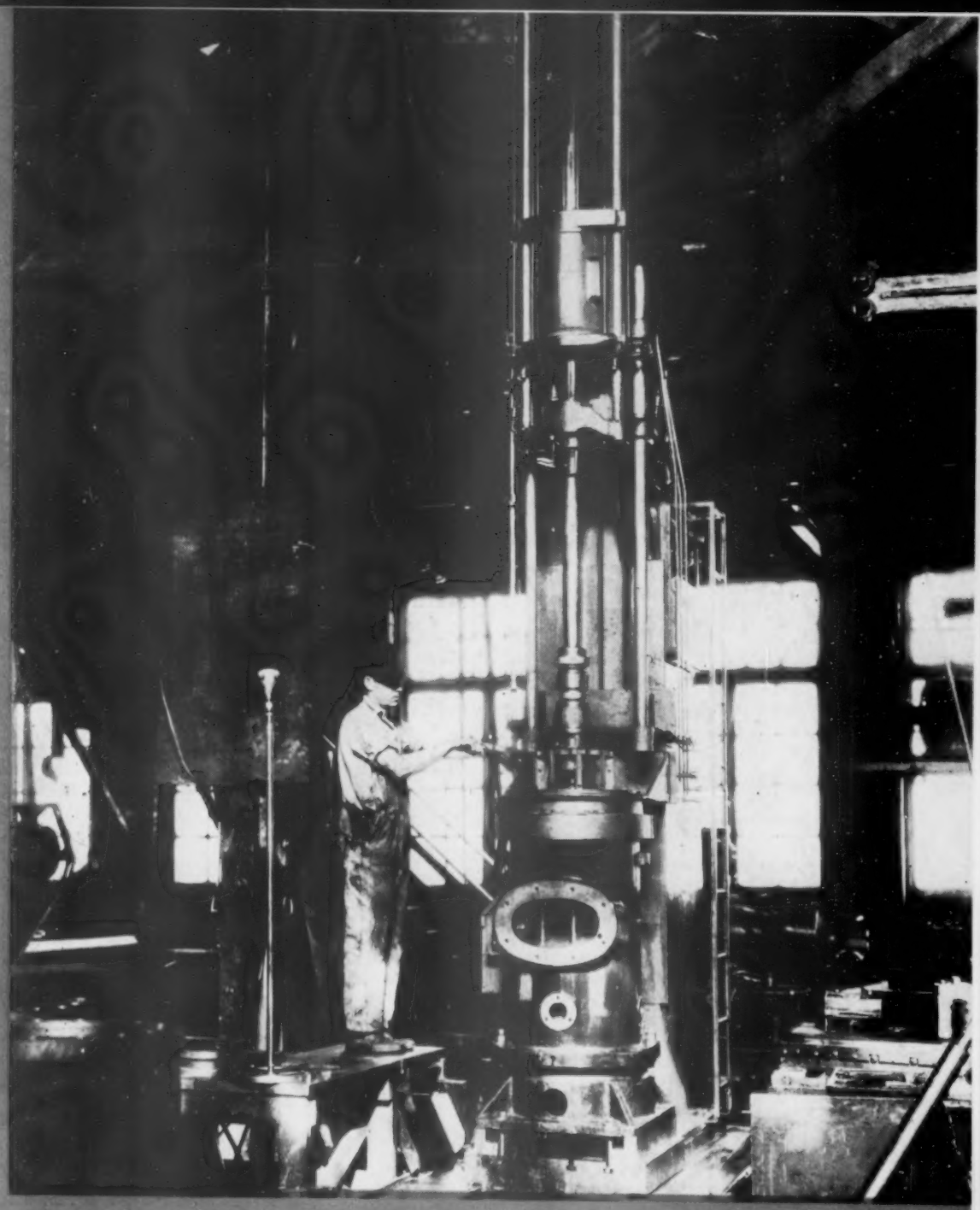

Honing Large Diesel Engine Cylinder *See Page 8.*

The A.S.T.E. Journal

Official Publication of the

AMERICAN SOCIETY OF TOOL ENGINEERS

ENGINEERED PRODUCTION
EXAMPLES FROM THE SUNDSTRAND FILES
No. 3411

Lathes
Milling Machines
Tool Grinders
Centering Machines
Balancing Tools

Stators — Stators — More Stators
Sundstrand Solves Another Problem

Stub Lathes are turning stators, rotors, and other parts, for about all of the leading electric motor manufacturers. Consequently it is only reasonable that Sundstrand Engineered Production should provide Stub Lathes for turning the joint surfaces on the stator shown in Fig. 1. Note that this stator comes to the Stub Lathe complete with coils and a guard ring, supports, and piping. The coils must be protected during machining, and the parts mounted on the outside of the stator must clear the tool blocks and slides. Moreover the stators must be located accurately in the Stub Lathe, and the tool slides must have several inches of rapid movement in and out in order to facilitate work-handling. All this was accomplished by the Stub Lathe shown in Fig. 2. Note the steel guard which covers the windings completely, and the air cylinders on the front and rear slides which provide the necessary rapid traverse. The close-up, Fig. 3, shows how the tool-blocks and slides clear the guard ring and other parts, also the extension of the clutch operating lever which provides automatic actuation of the rapid traverses.

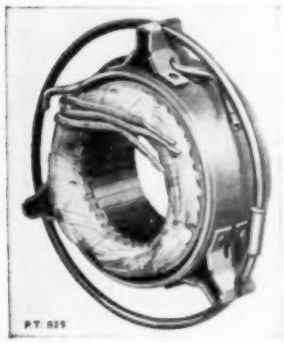

Fig. 1. Stator, with windings, guard ring and supports.

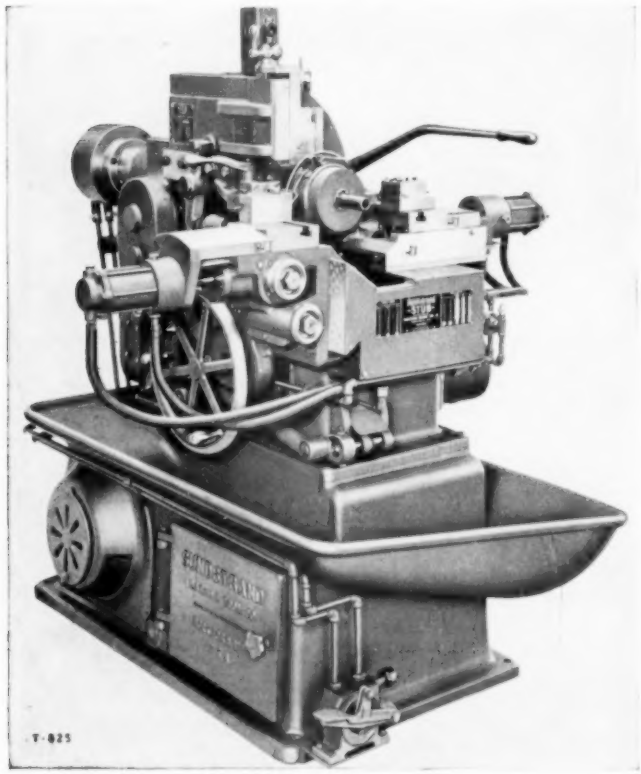

Fig. 2. Sundstrand 8" Stub Lathe for turning stators shown in Fig. 1.

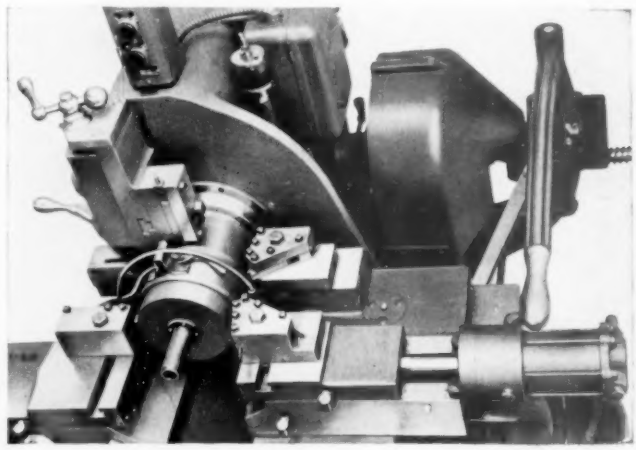

Fig. 3. Close-up, showing tooling and air valve operating arm.

Sundstrand Stub Lathes and Rigidmils have been applied, with notable success, to economical production of parts for many other products besides electric motors. Manufacturers having turning or milling problems are invited to send us complete data on which to base Sundstrand Engineered Production Proposals.

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NEW CENTER BUILDING • DETROIT, MICHIGAN • PHONE MADISON 3660
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The A.S.T.E. Journal

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BE SURE TO READ

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NEXT MONTH'S JOURNAL

Boring Bar Cutters, By Chas. F. Staples—Air Conditioning Developed for Truck Refrigeration and Busses—The Evolution of Organization, Chapter II, By John Younger—A Tool Engineer's Problem.

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GROWING
IN
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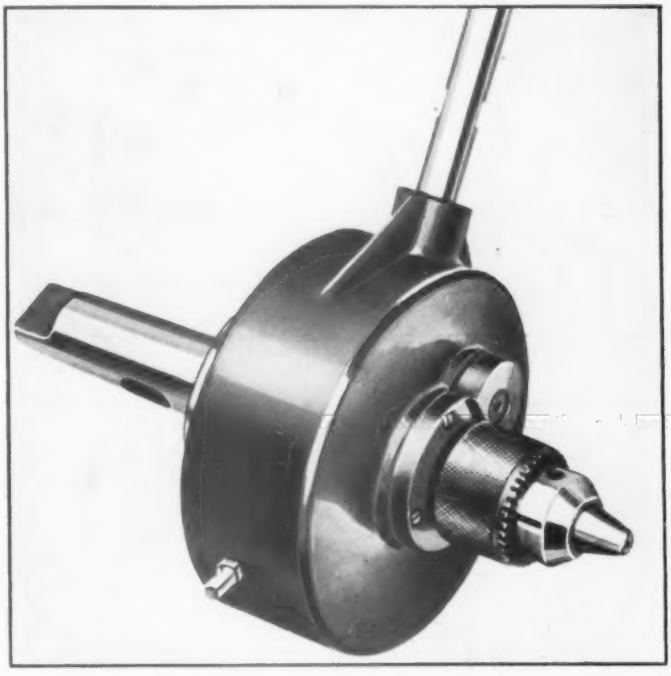
LAMB DRILL SPEEDER



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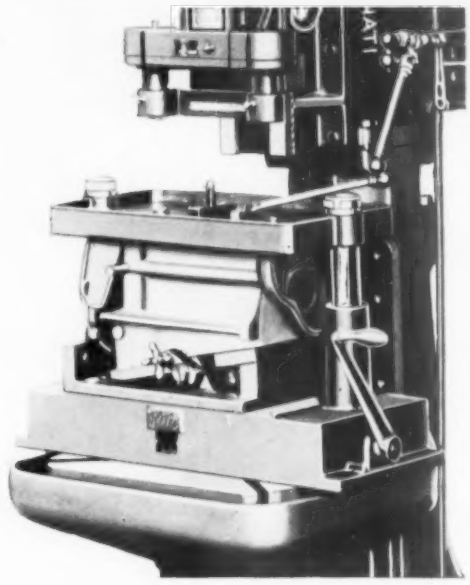

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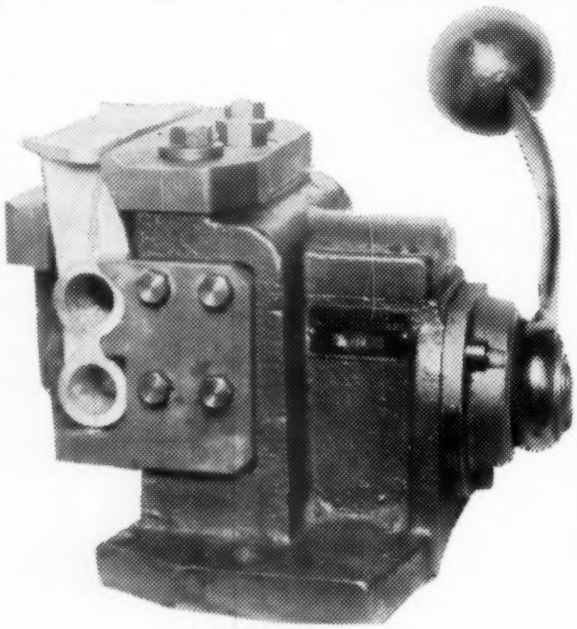

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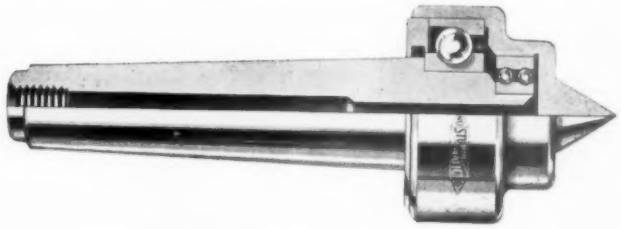

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ENGINEERING ETHICS

Engineering Has Felt the Impetus of the "New Deal"

Old Traditions Are Still Practicable

IT WAS INEVITABLE, in the frenzy of organization engendered by the New Deal, that engineering workers should also organize to promote their own interests. It was to be hoped, however—even, expected—that these, on a higher intellectual level than that of the manual worker, would unite, not only with the purpose of speeding recovery, but of insuring it; that they would be alive to the problems of reconstruction facing the Administration, and would extend their fullest consideration and cooperation to the solving of those problems.

Happily, such engineering societies were formed during the dark days of the depression. These have grown slowly but *sturdily*, carefully nurtured by conservative but progressive leaders, their memberships carefully selected and their programs projected along constructive lines. Happily, we repeat, such organizations have come into existence, in which membership is a mark of distinction; a recommendation to the employment manager.

Among these, the A.S.T.E. comes easily within the definitions of constructive organization. With a nominal initiation fee, and annual dues unusually low considering the services rendered, it has attracted alike the hard headed, discriminating executive and the more progressive among the rank and file of engineering workers, both of whom have been mutually benefited as a result of contacts remote from the office. They can meet on common ground, where human values show to their best advantage.

In common with ranking engineering associations, meetings of the A.S.T.E. are educational, with the general trend sharply *toward the higher levels*. Leaders—many of international renown—in engineering, manufacturing, industrial and social fields speak on subjects of vital interest to the membership. A conservative yet progressive spirit prevails; because of that, it takes rank as the representative organization of the engineering worker. For, the A.S.T.E. adheres strictly to engineering ethics and traditions.

And what, one may ask, is engineering ethics?

Engineering ethics and traditions are, inclusively, the code of morals as well as the practises of the engineer, which, in lieu of trite definitions, we interpret in broader terms. We must first define the engineer.

He is a planner, an inventor, a visionary—a dreamer if you will—who is ever in the van of the march of Progress. He conceives the creation of bridges and tunnels, of the means of transportation—the cart and the chariot, the locomotive and the automobile, the ocean greyhound, the submarine and the airship. He conceives the Trans-Atlantic cable and the telephone; radio, television and telphoto; he creates the electric light and the household appliance, the gamut of production machinery, ad infinitum.

by A. E. Rylander
Member A.S.T.E.

He need not, necessarily, be a college graduate. Were that the prime requisite, then civilization were the loser. Archimedes, Michael Angelo, da Vinci, Guthenburg, Watt, Fulton, Erickson, Edison, Steinmetz, Ford and Chrysler—what a galaxy among a host!—how many of these boasted of an engineering degree, unless conferred as honorary after their works had revolutionized civilization?

Yet, these are *engineers*, whose code of ethics, as well as the traditions which they pass on, can be defined in one word—SERVICE! Of them it can be said that they truly followed the Scriptural: "He that giveth his life shall save it." For these gave, if not their lives in the literal sense, at least the years of their lives to the advancement of civilization. They were rewarded, yes, some of them richly in the goods of the world, some in the satisfaction of a work well done, but in no case were they rewarded more richly than they gave. But, *they gave first*.

The engineer is a constructive leader; if not fearless at least a courageous one. There is a difference in favor of the latter. Like the captain of a vessel who is the last to leave his ship in time of distress, so the engineer is the last man out when a tunnel collapses; the last to leave a bridge should it threaten to collapse during construction.

He works in mud, dirt and grease, standing the gaff with his men when emergency demands. He shoots his levels under a broiling sun or in sub-zero weather, and works the clock 'round to complete a job on time, nor complains. Instead, he grins and bears it, encourages the faltering among his men or bawls the living hell out of the wilful laggard. *The job comes first*, the reward follows—and not always.

Of course, we have projected the high lights, for the sake of brevity. For there are the research workers, trying a thousand times, and failing, trying again—and winning! There are the plodders on routine work, which often requires a fortitude comparing favorably with the sublime

(Continued on page 14)

JOHN YOUNGER WRITES FOR A.S.T.E. ON THE HANDLING OF

MEN IN INDUSTY

John Younger, Professor and Head of Industrial Engineering Department, Ohio State University is very well qualified to speak on this subject. Serving his apprenticeship with a locomotive works in Scotland many years ago, he has progressed to tool engineer, works manager, production manager and chief engineer of some of the largest plants in both this country and abroad. His experience in the handling of men embraces a great many years in association with industrial employees of all types.

THE above title is usually written "The Art of Handling Men" and indeed for long years "Handling Men" has been considered an art, and not a science; but just as science is encroaching on all the other fields, so we are coming to a realization that science plays its part in the management of men.

We are finding that certain shops have less labor trouble than others and on searching we find there is a reason behind it and usually a simple reason at that. And yet man is a curious being and there are many actions that we still cannot explain. The personality of the manager still plays a large part in the work and although the psychologists have done much to explain that factor the fact remains that there is still much unexplainable.

Beyond all question, the fact remains that a contented worker is more easily managed than a discontented one, and the thing to do then is to find out why he is discontented and if possible remove the discontent.

We always have trouble in our sweatshop industries. Men are discontented at such work; the surroundings are usually unclean, the ventilation poor, the lighting abominable, and the conveniences unsanitary. On the other hand, our more progressive industries have found that it pays to provide for comfort in the shop. It is not a question of "can you afford to instll these conveniences;" it is a question of "can you afford not to install them?"

An so the object of these papers is to suggest means by which workmen can be made to feel more comfortable, more at home in their everyday work life. Contented cows, we learn, give better milk. Does it not follow that contented workmen give better work and more of it?

One curious thing that I do not understand is that manufacturers appreciate that money is an urge to work, hence the rise of our piece-work systems. Yet they do not understand that more urge (more money) will produce greater work. Some of our manufacturers have found it, and we can practically say that higher wages lead to greater efficiency and greater economy. More upon this later.

The results described in these articles are the product of some thirty years of working with men —working with them as mechanic and as manager.

SOMEWHAT HISTORICAL

What has industry been concerning itself with during its years of work? Its ideas, its methods have changed radically and man's place in the scheme has changed with it.

From the days of the ancient craftsmen down to the time of James Watt the thought has always been devoted to the work, and the satisfactory functioning of the work. The cost of doing the work, the methods of doing it were negligible items—only the means to the end. It was the final satisfaction of work accomplished that ruled. James Watt, in his workshop in Glasgow, found he could build a steam engine that would run—would actually move. This should be emphasized strongly as this motive is still strong. Among young men starting in machine shop work, the biggest satisfaction comes from having their simple project work and move. It is of course the joy of creation that is ever present.

James Watt did not proceed to make steam engines as a monopoly. Others started in and soon one engine was compared with another and such factors as indicators and brake horsepower, and pounds of coal per horsepower hour began to be discussed and compared. This era was the one in which performances were calculated, and the best sought for. Methods and costs were still somewhat in the background, for it was realized that there were many methods of doing a specific piece of work, but at that time we were experimenting and did not know which was the best one. There was little competition in those days as we know it now.

Today is the era of fierce competition in which every factor that enters into the product is under intensive scrutiny. Methods—costs—prices—functioning—performance are all under investigation to get the best possible. Not the least of the factors under the microscope is also man. It is realized in this country that man is the most important unit in today's industry. It is to his brain, his organization, his skill and his effort that we owe our tremendous projects of today.

Engineering in the earlier days was a matter of materials, stresses, and design. Today the enormous forces of cost and the human element are added together with that of processing, so that today's emphasis is on the man and the process rather than on the product.

The engineer who purely designs with his only thought devoted to the functioning of the product is relegated to the past. He must

(Continued on page 12)

NEWS NOTES OF INTEREST TO THE TOOL ENGINEER

R. R. Weddel of Ansonia, Connecticut recently returned from Birmingham, England, where he was engaged in establishing the design, manufacture and furthering of sales of inserted blade cutters for Richard Lloyd and Company, Limited.

Mr. Weddell was formerly chief engineer of the O. K. Tool Company of Shelton, Connecticut. He reports that the **British machine and tool trade is brisk** and enjoying prosperity as industrial production has gained sizable proportions and **most shops are working overtime.**

Martin Brown, formerly of the Cadillac Motor Car Company, Detroit has joined the Pioneer Engineering and Manufacturing Company as die engineer.

Bill Smila, Master Mechanic at Chrysler Jefferson Plant and former A.S.T.E. president has just returned from a vacation in Ohio in the vicinity of Bellefountaine and Clyde, where Bill was reared. He states his golf game has improved as a result of his vacation.

The A.S.T.E. Journal for July enjoyed the largest circulation of any issue since it was first published. Sixteen hundred copies were dispatched to all parts of the country and to a number of foreign countries. With the spread of The Society to other important tool centers, it is inevitable that the official publication of The Society will become a source of increasing interest to tool men in all industries.

Death of Charles Sweeney—it is with genuine regret that The A.S.T.E. Journal announces the death of Mr. Charles Sweeney, well known to members of The Society. Mr. Sweeney obtained his engineering training at the University of Wisconsin. His first practical experience was with the Fairbanks-Morse Company at Beloit, Wisconsin. Coming to Detroit in 1914 Mr. Sweeney became associated with Briscoe Motor Company and later with Hinkley Motors. More recently has was connected with the George A. Gloor Company in the capacity of chief designer, and for the past year was chief designer with Swartz Tool Products Company.

Mr. Sweeney was forty-three years of age and is survived by a wife and two daughters aged 13 and 15 years.

Meet Our Members

B. L. DIAMOND

B. L. Diamond, a charter member of The American Society of Tool Engineers, is well known for his ability as a designer. Many consider him as one of the best designers in the country. His work as designer and manufacturing executive has embraced, over a period of some tweny years, automobiles, marine motors, tractors, trucks and a number of specialty products. The past ten years of Mr. Diamond's activities have been as a tool engineering executive.

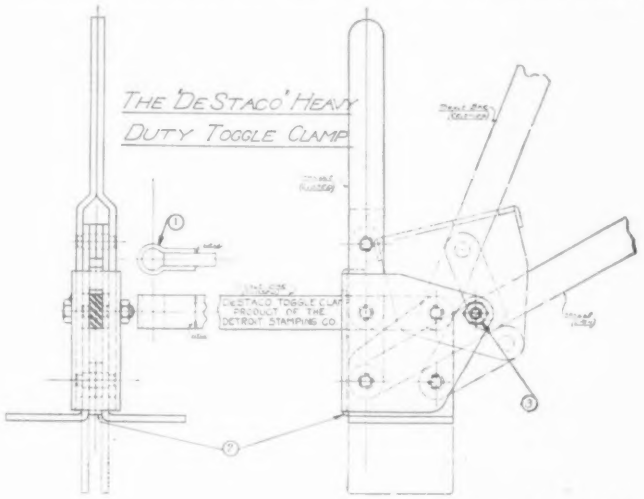
Mr. Diamond has been active in affairs of The Society, serving at present as Director. He was formerly an associate editor of *The A.S.T.E. Journal* in charge of a section entitled "New Tools." He has also served The Society in the capacity of Chairman of the Nominating Committee.

Born in Pointe Au Roche, New York, Mr. Diamond received his early training and education there, coming to Detroit in 1911. He is a young man, and with the achievements already to his credit, all join in wishing him continued success.

A.S.T.E. MEMBER DEVELOPS TOGGLE CLAMP

Frank L. McKenna, A.S.T.E. member and Production Manager of the Detroit Stamping Company, Detroit, Michigan, has recently developed a toggle clamp, unusual in its construction and adaptability. Mr. McKenna states the clamp is now ready to market and will be known by the trade name "DeStaCo," being the product of the Detroit Stamping Company.

Tool designers, die designers and sheet metal men will be particularly interested in this clamp because of its adaptability to holding work in fixtures, dies and fixtures for holding the work while being



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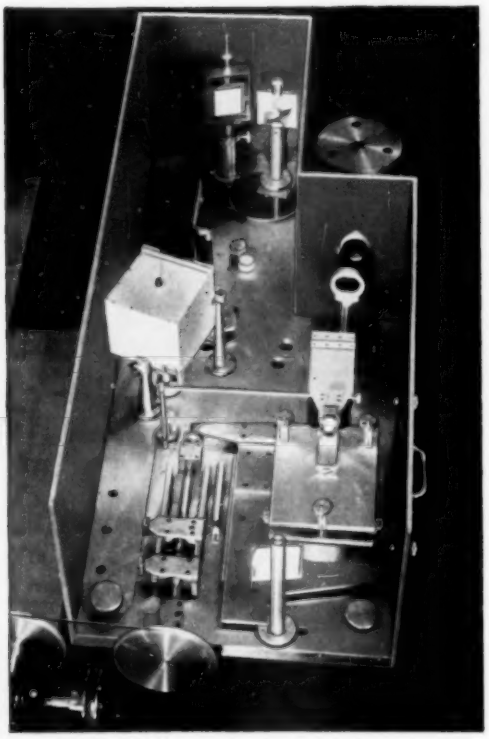


Profilograph (Profile-o-graph) ingenious device, developed at University of Michigan, for the measurement of surface smoothness or accuracy. A photographic record is made showing the profile of the surface being studied. See records so made on opposite page.

PROFILOGRAPH SHOWS HONING PRODUCES A SUPERIOR SURFACE

CONSTANT improvements in the production of various manufactured products of the present times would lead the uninitiated to wonder how much further these improvements can go—or, finally, to what further degree of accuracy they can be made. The tool engineer and the research physicist have gone hand in hand to bring about a much higher degree of accuracy and "finish" in many ways—a shining example of which is the measurement of *surface* smoothness or accuracy and the production of superior surfaces on an economical production basis. We refer, specifically, to the Profilograph developed by the University of Michigan and modern honing operations.

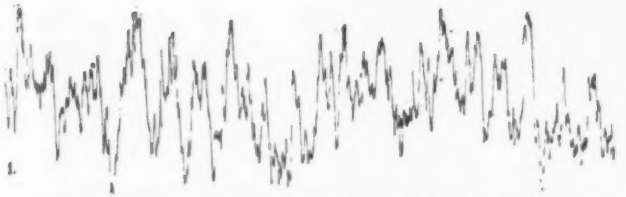
The Profilograph is literally a machine for magnifying inaccuracies of millionths of an inch occuring on surfaces that are tested by this machine. This is accomplished by recording, photographically, greatly enlarged sections of the profile of the surface being studied—hence the name, which is pronounced Profile-o-graph. Photographic records of surface profiles by the Profilograph have settled many arguments of long standing relative to various methods or operations of finishing—one of these is honing.

With the un-impeachable record of the Profilograph, honing is shown to be a superior process for commercial production in a wide field of applications. The "mirror finish" is now shown to be actually a superior finish that is quick, economical and entirely suitable for mass production methods.

Many progressive industrial corporations now recognize research as important as almost any phase of successful operation. Research service is available at the University of Michigan on a thorough comprehensive scale at a cost basis. Inquiries should be addressed to Engineering Research, University of Michigan, Ann Arbor.

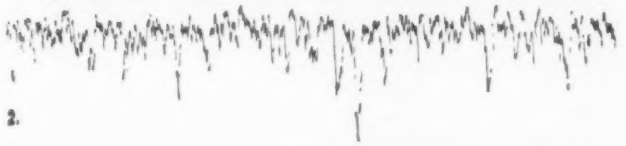
Of interest to those responsible for economical mass production are the honing tools of the Micromatic Hone Corporation, Detroit. This company, through its various types of hones has made possible this "mirror finish" for all types of products from automobile cylinders and compressors for refrigerators to locomotive compound compressor cylinders and the unusually large Diesel Engine cylinder, such as is shown on the cover illustration of this *Journal*. This type of honing is no longer restricted to bores that are considerably longer than the diameter, as was formerly the case in honing operations. Now, honing of medium-sized bores of various lengths—even with the same length as diameter—and with interruptions (openings) can be finished-honed with equal facility and accuracy.

In the nine years that honing processes have reached their greatest effectiveness and use, almost universally replacing other methods, great progress has unquestionably been made in improving finish and accuracy. Now science has shown, through the ingenious Profilograph, that it is the practical, economical and accurate method that the sponsors have long striven for.



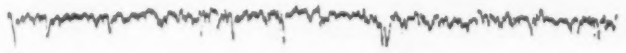
1.

TUNGSTEN CARBIDE BORED FINISH C. I. CYLINDER PORTABLE BAR "A"



2.

TUNGSTEN CARBIDE BORED FINISH C. I. CYLINDER PORTABLE BAR "B"



3.

INTERNAL GRINDING ON CAST IRON

4.

POLISH HONED SURFACE C. I. CYLINDER WITH FINE STONES PORTABLE TOOL MFG. "C" SHOWING NO CLEAN UP AFTER FINE BORING

5.

MICRO-HONE MIRROR FINISH

Typical photographic records made by the Profilograph of various surfaces and by various methods. These photographs are made by a tracer system, in which a very sharp diamond point, resting very lightly on the specimen, "traces" the profile of the surface, which is greatly magnified and recorded on photographic paper.

MEMBER DEVELOPS CLAMP

(Continued from page 7)

welded. The heavy metal housing of the clamp is also a safety measure that tool engineers should consider.

The drawing of the clamp, above indicates some of the unusual features. Every part is a stamping—of cold rolled steel. The toggle arm is of very substantial construction permitting twisting or cutting off to suit individual requirements. The standard length of the arm is 12". It may be had with a, loop-end as shown at (1) above, so as to allow for a bolt and nut adjustment—up and down—and attachment to the work.

Unusually large bearing surfaces on either side of the toggle arm assembly and the sides of the clamp provide an excellent means for preventing side-sway, at the same time insuring absolute accuracy in locating the work. An added feature of accuracy in locating the work and preventing side-sway are the projections at top and bottom of toggle assembly shown at (2). Wear of the entire clamp is compensated for by a simple adjustment at (3) in the detail above.

NEW LITERATURE OF INTEREST TO TOOL ENGINEERS

Anti-Rust—A new Loxal powder and solvent has been developed by Curtin-Howe Corporation, 405 Lexington Avenue, New York City. It is claimed this product will supply a good bond for subsequent coatings, and is easy to apply.

The Norton Company, Worcester, Massachusetts recently announced a new **"Universal Tool and Cutter Grinder."** It is designed specially for sharpening cutters and reamers and other light tool grinding operations. Several types of wheel spindles are available for different classes of work. Address above company for descriptive details.

Paint Fluid Hose. This new product provides better coupling facilities, is resistant to all commercial solvents, and is suitable for paint, varnish and lacquer spraying equipment. Address Electric Hose and Rubber Company, Wilmington, Delaware.

Landis 12"x32" Tool and Cutter Grinder. A new product of the Landis Tool Company, Waynesboro, Pa. Literature on this grinder is available for general distribution—specify catalog No. 034.

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A NEW
TOGGLE
CLAMP
FOR DIES,
TOOLS AND
FIXTURES

The new DeStaCo
Toggle Clamp

Here is a well engineered product of pressed steel, adaptable to a variety of uses. This clamp can be ordered with straight or flanged bases—or reversed action for vertical applications.

Write or phone for Blue Prints or Catalog.

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NEXT DETROIT MEETING

September 13

Speakers and Their Subjects

B. L. Diamond, Ternstedt Manufacturing Company, Design of Fixtures for use on Projection Welding Machines.

W. Maxwell Gray, Congress Tool and Die Company, The Automobile of the Future.

O. B. Jones, Detroit College of Applied Science, Engineering Design Principles Simply Applied to Tool Engineering.

F. R. Lamb, Consolidated Machine Tool Corporation, Screw Threads.

R. M. Lippard, Heald Machine Company, Processing Connecting Rods to be used with Steel-Backed Bearings.

W. H. Smila, Chrysler Corporation, Subject to be announced later.

(For details of September meeting see next issue)

THE URGE IS THE THING

If the urge is sufficiently great a man will say what he believes should be said regardless of surroundings, whether he's before an audience of five thousand or merely remonstrating with a mule. I've often wondered if the best way to become a public speaker isn't to fill the soul with an ideal and the mind with ideas which cry for liberation.

If we look back over the history of our country we find that great orators were created by an existing emergency. The whole being of a certain man pulsed with the demand for action. He was so full of his subject and so thoroughly sold on the necessity for having his idea adopted by the political party of which he was a part that he could not restrain himself nor could anyone else stop him. Abraham Lincoln was made by his hatred of slavery. One of the greatest literary masterpieces of all time was merely the outpouring of his overwrought soul at the battle-field of Gettysburg.

Our "silver-tongued" orator, William Jennings Bryan became famous as such merely because he believed so strongly in the various causes he espoused and was so full of ideas as to why the cause he backed was the only cause which should be adopted that he was incapable of remaining silent.

The force which commands attention of the multitudes is the power of the mind of the man. Ideas command attention. Diction, jestures, language are forgotten by the man who has an idea to sell and are not missed by his audience. The man who hasn't an idea can never become a convincing public speaker.

Something new to think about—something for the mind to toy with, as a cat plays with a crippled bird; not too violent recreative mental exercise for Mr. Average Man in the audience—that's the way to fame as a platform speaker.

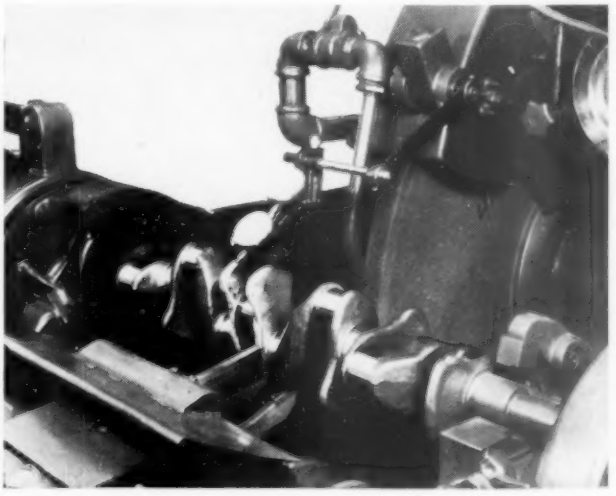
All Crankshaft Pins Ground in One Handling on New Landis Machine

The new Landis 16" Type D Hydraulic Crank Pin Grinder is a highly refined and massively proportioned machine for the rapid production grinding of crank pins. Like the first Landis Hydraulic Crank Pin Grinder announced nine years ago, the major advantage of the new Type D is the combination of design features which make possible grinding all the pins of any crankshaft on one machine with but one handling of the work.

Grinding all the pins of a crankshaft on one machine is now the accepted method. The many advantages of this method over the older method of grinding each pair of pins on a different machine, are very generally recognized. These advantages include less handling (sometimes as much as 75%), increased production, closer accuracy and greater convenience in the placing of grinding equipment in the production line. All this is brought about by attaching the work rest to the front of the bed and properly coordinating the work rest jaw movement with the wheel feed, the table traverse and the means provided for clamping, radial locating and longitudinal spacing.

The bed of the Landis Type D Crank Pin Grinder is heavy, of box type construction, and well ribbed. Work table and wheel head guides are of such size and so spaced as to give the support required by these sliding members. Crank head spindles and bearings are larger than they have been heretofore. The wheel drive motor is mounted on the rear of the massive wheel head. From this point it drives the wheel spindle on the end by means of multiple V belts. The wheel spindle is an exceedingly large one and the long bearing surfaces of the Landis babbitte lined steel wheel spindle bearings give it solid support. The stationary hydraulic work rest is a massive casting bolted firmly to the front of the bed. To give it still greater rigidity, the base is bridged over the work table and bolted to the bed below and in front of the grinding wheel.

(Continued on page 13)



Typical grinding operation on the new Landis 16" Type D Hydraulic Crank Pin Grinder. Design features make possible grinding all pins in one handling of the work.

RECENT PATENT GRANTS OF INTEREST TO THE TOOL ENGINEER

By WILLIAM J. BOYD
Washington Correspondent, *The A.S.T.E. Journal*

Machine Tool

Leo. A. Dumser, of Rockford, Illinois, has been granted a patent which relates to actuating mechanisms for movable supports for machine tools.

It is the general object of this invention to provide a more actuating mechanism for tool or work supports embodying means whereby the support may be stopped accurately and positively at a predetermined point in its travel, and after a time interval, reversed and returned.

Another object of this invention is to provide such an actuating mechanism embodying mechanical means for moving a support, together with auxiliary means for obtaining a dwell in the movement of the support, with the mechanical means continuing to operate.

Treatment for Steel Tools

Max Hardtman and Arnold Werner, of Leipzig, Germany, have been granted a patent, No. 1,965,037, for an invention which relates to the treatment of steel tools, but more particularly to a process for improving and sharpening tools having cutting edges.

According to this invention a process is provided wherein by chemoco-electrolytical treatment with chemical substances the soft constituent of the metal, particularly the ferrets, which are more readily soluble in the said chemical substance, are dissolved out of the blades or cutting edges of tools, whilst the hard, more valuable, soluble constituents, particularly the pearlite and cementite, are only attacked to a lesser extent, and therefore remain for the most part in the metal. At the same time worn cutting edges are reinstated, inasmuch as the action of the chemical substances in the chemico-electrolytical process, according to the invention, takes place at the lower part of a cutter or tooth at a different speed from that at which it takes place at the upper part of a cutter or tooth, as a result of which the cutter is naturally renewed.

The aforesaid results may be obtained, according to the invention, by a strict adherence to the principles outlined in this patent grant.

Cutting Off Machine

Walter A. Archea, of Norwood, Ohio, has been awarded a patent for a contrivance which relates to a cutting-off machine, and one of the objects of this machine is the provision of an improved machine for simultaneously severing a plurality of pieces from each one of a plurality of bars of stock.

Another object of this invention is the provision of a cutting-off machine for stock having means for squaring the ends of the stock and additional means for severing a plurality of pieces of various lengths therefrom in a single operation.

SUCCESSFUL METHOD FOR POLISHING STAINLESS STEEL

By A. H. Johnson*

The polishing of stainless steel has been a problem for many manufacturing executives. Varying degrees of success have been attained, but very little uniformity has as yet been obtained and the finish has not very often been up to the standard that was desired. The following method has been known to give an excellent finish and is now being used successfully by a number of large plants.

After the machining operation, grind with a 60 grit soft wheel, run dry, moving the wheel back and forth to prevent over-heating. Finish grind with a 100 grit soft wheel.

Lap using pumice with oil, if heavy, thin with kerosene. As a lapping compound aluminum oxide has been found very good. In either case the compound should be 180 mesh or finer.

Polish or buff with very soft muslin. For a buffing compound a green chrome oxide "Rouge" is recommended and should be at least 250 mesh. Be very sparing in the use of oil as it will tend to cloud the finish.

Never use a buffing wheel or lap on stainless steel that has been used on plain carbon steel.

Experience, only, can determine the amount of oil to use in the lapping and buffing operations.

The different alloys have their distinctive polishing characteristics. Straight chromium offers more trouble in actual polishing because of a galling or scoring tendency. The polishing wheel tends to load up and produce grit or score lines.

In order to get uniform results in polishing of stainless steel, it is necessary to have steel that is uniform. A segregation of the alloys will show up in spots on the finished surface. Also if you get a large grain growth in heat treatment, it is impossible to get a good polish, so oftentimes poor polishing results may not be due to the polishing process, but due to the structure of the steel itself.

*National Forge and Ordnance Company.

Editor's note: Mr. Johnson, will be glad to answer any inquiries relative to the polishing of stainless steel. Address him in care of *The A.S.T.E. Journal*—6432 Cass Avenue, Detroit, Michigan.

Valve Seat Tool

Frank O. Albertson, of Sioux City, Iowa, has just been granted a patent which relates to valve seat tools, and is particularly concerned with tools for cutting recesses in valve seats for the insertion of a new valve seat or valve seat ring.

This invention relates, too, to an improved commercial form for cutting tools, and is of particular importance in connection with the reconstruction of valve seats for internal cumbustion engines, since it is peculiarly adapted to favor annular recesses for the reception of new valve seats, or to furnish the engine block with a seat of harder material, but the tool is also of general application to circular cutting operations of all kinds.

THE HANDLING OF MEN IN INDUSTRY

(Continued from page 6)

supplement his information with such additional items as, "What will it cost?" "How is it going to be made?" "Who is going to make it?"

It is the last question with which we are going to concern ourselves.

The rise of manufacturing has been rapid during the last hundred years, but it was not until Frederick W. Taylor's work began to appear around 1905 that opinions regarding a science of manufacturing began to appear. Laws of management were not enunciated until L. P. Alford's work appeared in 1926. We can see at present a belief that a science of human understanding and of human work will appear, but as yet we are just on the threshold, and there is much to be done.

There were several foreshadowings of mass production, chiefly in the pistol, rifle, and sewing machine fields, but it was not until about 1910 that the tremendous possibilities of mass production began to become known. The war of 1914-1918 crystallized these possibilities and today mass production is revolutionizing our systems of manufacture. And with this revolution has come about a great change in man's position in industry.

Let us compare for a moment the old type of craftsman with today's operator. There are still sume survivals of this old fellow but they are rare, existing only in the country's blacksmith shops and in small village industries.

Early in the morning our genial craftsman would go forth and seek and order, say, for a dining room table from some local individual. Let us emphasize this word local, for it plays an important part in the work. If lucky he would get the order, and would then proceed to the local lumber mill and he himself would pick the most suitable wood for his use. On his wheelbarrow or horse-drawn truck he would take it to his local woodshop and there he himself, with perhaps the aid of an apprentice or two, would proceed to do all the operations necessary to make a table. He would plane and chisel and mortise and tenon and sandpaper and oil and stain and wax until the pieces were ready for assembly. He would put them together and perform the final finishing operations and then on his truck take the table to his customer—deliver it, get his money and the cycle of work was finished; he was ready for his next job.

Today's industry is vastly different. The individual selling his table has been replaced by a sales organization with ramifications all over the world. The procurement of lumber is done by a purchasing organization seeking its materials from over the world, so that it can get the best and the cheapest. Transportation is no longer by the slow horse buggy but by train and motor truck and even by airplane.

But it is in the field of fabrication that the greatest changes have occurred—changes that vitally concern the man.

The man no longer does everything from start to completion by himself. Instead his work is so subdivided that he only makes one or two little moves toward the final results, and instead of the man doing the job, the machine usually does it.

Let us consider the first part first. Some twenty or so years ago an automobile was assembled by having a gang of men complete everything on the chasis. They would first of all assemble the frame, and from there proceed to the assembly of springs and thence to the axles, and thence to the engine and so on.

Today one gang assembles each unit, and the work of each man in the gang is clearly defined, so that one man places the bolts, another fits the nuts, and perhaps a third tightens the nuts.

The work is subdivided down to its minute details. To quote still a further example from the manufacture of flat irons, there is a particular stage in the operations where the irons are placed on a conveyor just as they leave the hands of the assemblers. At this point in the conveyor there is a girl stationed who takes these flat irons and arranges them all in regular military-like precisional order prepositioned for their next handling. That is all the girl does — nothing else but turn flat irons around.

Is it any wonder that one large automobile manufacturer says he can train a green man for his life's work in six hours and that another manufacturer of tires in this instance says that no more than six days is sufficient.

Truly there arises here a tremendous thought that we are misleading ourselves in believing that our education should be devoted to a man's life work. Rather, and especially in view of the furthering of the six-hour day and the five-day week, should we consider training and educating our workers for their leisure periods. Possibly there should be two systems of schools, one for those subnormal mentally who will never be more than machine or assembly operators and one for those who are above average mentally who will make our thinkers and planners in our modern industry.

The development of this thought is outside the scope of this text and is merely mentioned as showing what a tremendous social effect the change in the industrial world has caused.

Now let us consider the second part, namely that the machine now does the work. What is equally important is that it also does the thinking, so that man has now become the machine and the machine has become the man.

A factor known as "Transfer of Skill" has been in operation these years taking the skill and thought away from man, and incorporating it in the almost human-like mechanisms of the machine.

The invention of the screw cutting lathes took away the effort from the man, but still he had to have the skill and the thought to select the tools and set them, and set up the change gears, and gage the depth and width of the cut and so forth. The man still did the thinking.

Then came the invention of the die head wherein the tools were automatically set, the depth and width and pitch of the thread being all arranged for on the machine, and man being left with no further thought than that of picking out the right diameter of steel and the right die head, and arrang-

ing their conjunction. We find that the effort, skill and thought have all been taken away from the man and transferred to the machine.

Today's thread rolling machine emphasizes this point most strongly. In such machines all a man has to do is to empty tote boxes of bolt blanks into a hopper, the machine does the rest,—the machine does the thinking and produces a most accurate product.

The writer was visiting a large roller bearing plant recently and was watching the operation of a Blanchard Grinding machine. This machine takes bearing races on a circular table holding them down by means of a magnetic chuck. The table rotates and presents the faces of the races under a large grinding wheel which finishes the width of the races to an accuracy of some 0.0005 inch. After the races have left this wheel the chucks become demagnetized and a scoop diverts the races into a chute which holds a device for demagnetizing the races and finally washing them before delivery into a tote box. The machine is complete, highly automatic, and very accurate. An elderly woman was operating this machine and I paused to ask her a question. She turned to me with no comprehension in her eyes and answered in accents of Austria, "No spik." All this woman had to do was to lift the bearing races from a tote box and place them on the table—nothing else. She only needed this intelligence and no more. The machine had all the requisite intelligence for finishing the job.

Incidentally, because this woman had no intelligence required for the machine, one must not assume that she had no intelligence at all. As a mat-

(Continued on page 14)

CRANK SHAFT PINS GROUND IN ONE HANDLING

(Continued from page 10)

All this well placed weight and rigidity accomplishes two purposes. First, it permits rapid stock removal without vibration being set up in the machine. Second, it is responsible for a higher standard of work output—with respect to both finish and accuracy.

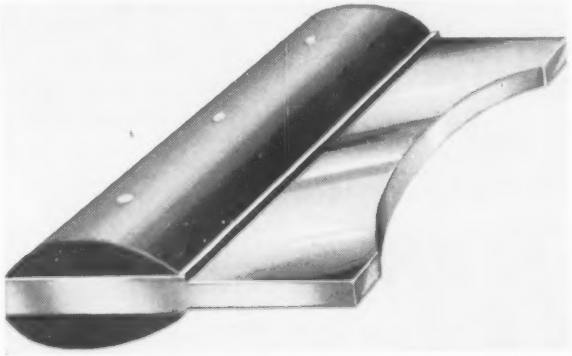
Every effort has been made to facilitate operation of the machine. Crankshafts being heavy, it should not be necessary for an operator to lift them to such great height when loading. The new Landis solves this problem as far as practical because the distance from the floor to the work center line is only 36". Controls are arranged in such a manner that the main control lever has a large number of functions. As it is shifted from one position to another it (1) clamps the work, (2) starts work rotation, (3) advances the work rest shoes, (4) withdraws the work rest shoes, (5) disengages the spacing bar plunger (6) traverses the work table either right or left, and (7) releases the spacing bar plunger. Another convenient lever to the left of the main control lever is used to unclamp the work. A natural result of this centralization is that the operator has fewer controls to manipulate and therefore saves time and effort.

Numerous safety features have been provided to protect the machine and operator from injury in the event there is a slip-up at any point. A mechanical inter-lock in the main control mechanism makes it impossible when grinding to traverse the table, or when traversing with the wheel in (that is, during truing) it is impossible to rotate the

(Continued on page 14)

Laboratory Accuracy On A Commercial Scale That Brings Economy To Production

A difficult job to salvage is this piston ring groove gauge. Yet Lincoln Park Tool Company's Chromium



Plating, grinding and lapping methods increase wear life many times — saving much time and expense.

"UP TO SIZE" — FIVE TO TWENTY TIMES AS LONG

The piston ring groove gage shown above will be recognized as a very difficult job to make or salvage, due to the precision required and thin section of the gage. Specifying lapped chrome plate here enables the gage maker to ignore the usual hazards such as cracks, distortion—soft spots, encountered on this type of work. We render the steel body of this gage practically inert, making it just hard enough to properly back up the plate. This inert core coupled with long wearing chrome plate is the ideal piston ring groove gage.

Let us prove to your satisfaction the economy of Lincoln Park gages. Your inquiry will bring convincing proof.

LINCOLN PARK, LINCOLN PARK TOOL COMPANY MICHIGAN

ENGINEERING ETHICS

(*Continued from page 5*)

courage engendered of emergency. It takes guts to be an engineer; it requires a moral courage often as not but little appreciated by those remote from the fields of creative work.

Taken all in all, engineering ethics are defined in terms of Service; engineering traditions expressed in terms of constructive endeavor. The engineer does not destroy, unless for purposes of reconstruction. Nor does he band together with his fellows to force issues, or to impede progress, or to legislate for the closed shop. He stands on his own feet in relation to his employers; he unites with his kind, not to gain strength to enforce arbitrary demands, but to collectively *cooperate* toward the advancement of standards, be they standards of thread dimensions or standards of living.

And that, reduced to essentials, quite defines both engineering ethics and engineering traditions, as it also, in passing, defines engineering organizations. When an engineering group adheres to those principles it will have little need of high pressure salesmen—or agents. If it has an idea to sell, and it falls within the scope of engineering ethics, it will be all too eagerly accepted. For, it will be reasonably sure to have merit.

WHICH DO YOU WANT?

JUST A DIE SET... OR A LONGER LIVED DIE

Danly Die Sets Give Longer Lived Dies—

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DANLY DIE SETS

HANDLING OF MEN

(*Continued from page 13*)

ter of fact she had been a highly skilled truck garden woman who had gravitated into the manufacturing world. There are many instances of men doing this unintelligent work at machines or assembly benches who are very intelligent otherwise. Working their six or eight hours earning their bread and butter in this fashion they utilize their leisure hours in the promotion of some problem in which they are quite skillful. They may be artists or photographers, or musicians on the side. Many of them are highly intelligent outside of the work periods.

We have seen therefore a great change come over men in the past few decades. How long is this trend likely to persist is a question that only the future can answer. A few years ago there was a great moving picture called "Metropolis" which sought to portray the factory life of the future with mechanical men, "Robots," taking the place of men. Hordes of these automatons were released from the workshop door at the sound of the whistle and as they trudged wearily to their homes one was reminded unconsciously of the release of convicts from a prison.

Tomorrow's factory will be nothing like that. Instead it will be one huge machine of many geared up parts in which man's function as an operator will be to press sundry buttons or throw switches and the machine does the rest. One can almost visualize the factory of the future in a more or less humorous way as a place where when the whistle blows, one man—the button pusher—will walk out.

There is a forecast of this type of place already in the plant of the A. O. Smith Company of Milwaukee, where human-like machines perform all the operations in making automobile frames with marvelous precision and accuracy. Only a relatively few men—observers rather than operators—are necessary for starting and stopping the machines.

Do not be misled by the above statement. Men may not be required to do things, but they will still be required to think. Men of unusually high ability will be required to design such machines, to build them and to set them up. They will also be required to maintain them. The future for such men looks unusually bright.

NOTE:—This is the first of a series by John Younger on *The Man in Industry*—a study in "human engineering" of vital interest to the manufacturing executive.

(*Continued from page 13*)

heads. The heads will not rotate with the work unclamped nor will the heads rotate during work table traversal. As long as the work rest shoes are in their operative position the work table cannot be traversed. If for any reason pressure in the hydraulic system drops, work rotation will automatically stop. An interesting piece of optional equipment is a wheel dresser built into the top of the grinding wheel fender. Its use facilitates dressing the wheel inasmuch as the dressing wheel is always set up and the work need not be removed during the dressing operation.

This new Crank Grinder is being offered in two sizes, namely, 16″x32″ and 16″x42″. The former requires a floor space of 7′6″ x 12′0″, the latter requires a floor space of 7′6″ x 13′0″.

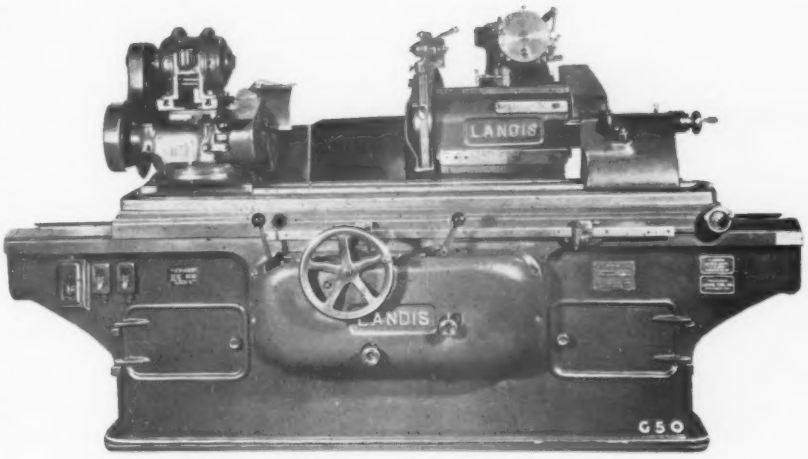
A Manufacturing Universal for the Tool Room . . . . . .

THE requirements of many tool rooms are such that certain grinding operations may be performed on a manufacturing basis. Light, obsolete machines simply will not produce economically. A need, therefore, has existed for a manufacturing Universal such as the new Landis 14" Type C Hydraulic.

On this page is pictured the 14"x36" size. There are two others, a 14"x48" and a 14"x72". Sturdiness of design and well placed weight are evident at a glance. Hydraulic table traversal of wide speed range coupled with a multiple speed headstock enable the operator to always use the most efficient combination of speeds for whatever job being handled. End wheel spindle drive through multiple V belts in connection with pump lubricated Landis babbitt lined steel bearings assure real metal removing power.

Wherever similar tool room parts (jig posts, mandrels, boring bars, dies and like work) are ground in any quantity, this machine should be used. Complete universal equipment enables the machine to fulfill a wide range of tool room grinding requirements. Many possible uses exist even in the regular production grinding department or in the machine repair department.

You will be surprised at the savings which will follow the use of a Landis Type C Universal in YOUR tool room.



LANDIS TOOL COMPANY, Waynesboro, Penna.

DETROIT-5928 SECOND BLVD.

140

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BALANCED DRIVE INVERTED SPOTFACERS

In High Speed Steel and Hand Metal Tipped

An ideal tool for back spotfacing or counterboring inaccessible surfaces which cannot readily be spotfaced from above.

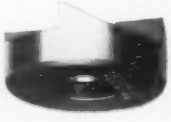
The drive is accomplished by parallel keys which are integral parts of the solid cutter at the lower end. This strengthens the Cutter and gives it a grinding life of practically its full length. The Cutter rides free and in alignment on driving member of the Pilot, thereby assuring a cut on every blade at the same time.

Furnished with the conventional Morse Taper Shank, pictured at left, or the Eclipse Shank, shown at right.

When tooling up for new models, get the benefit of our twenty years experience in developing

and manufacuring Counterbores, Spotfacers, Core Drills, and Multi-Diameter Boring Cutters.

Eclipse factory representatives in all industrial centers.



ECLIPSE COUNTERBORE COMPANY

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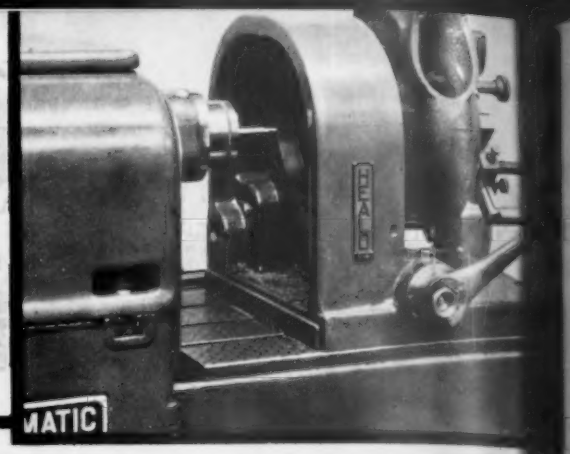
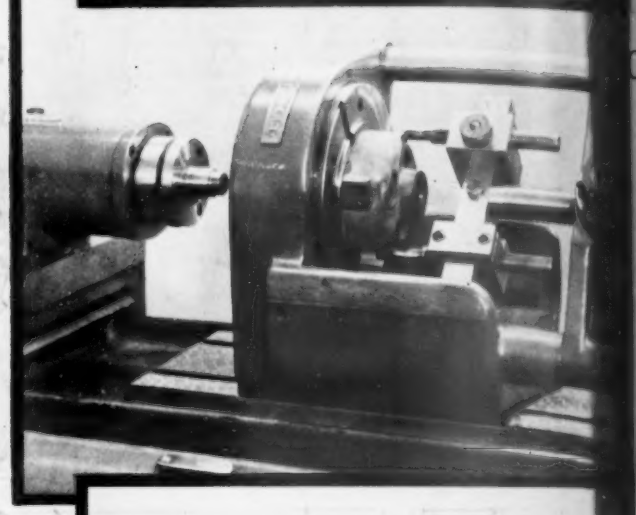
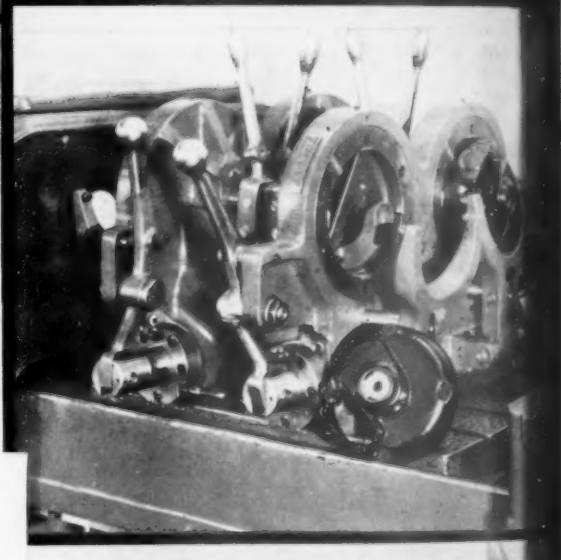
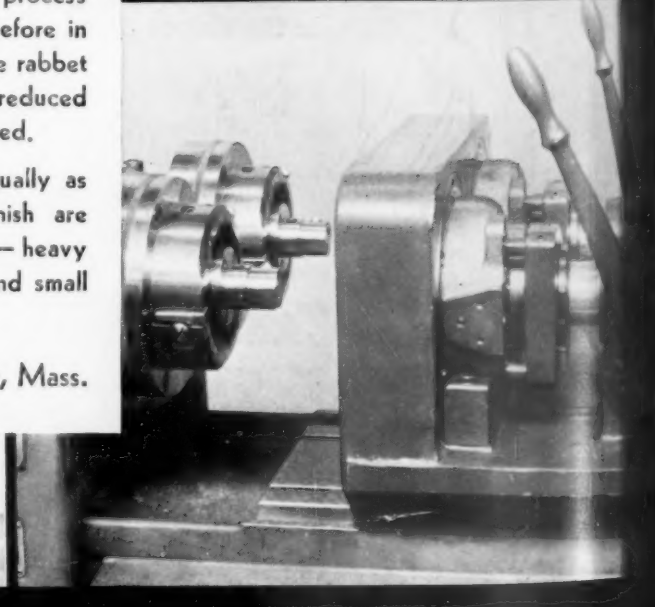
Motor End Shields Of All Kinds Handled On HEALD BORE-MATICS









HEALD Bore-Matics are boring and where desired facing motor end shields of every description. By this borizing process manufacturers are holding to closer tolerance than ever before in size, straightness and concentricity of the finished bore to the rabbet diameter. More important yet, cost per piece has been reduced materially while the efficiency of the motor has been increased.

What has been accomplished with end shields is equally as applicable to many other parts where accuracy and finish are demanded. Heald has a complete line of Bore-Matics — heavy double end for mass production, single end in medium and small size. One of these is sure to meet your requirements.

THE HEALD MACHINE COMPANY, Worcester, Mass.